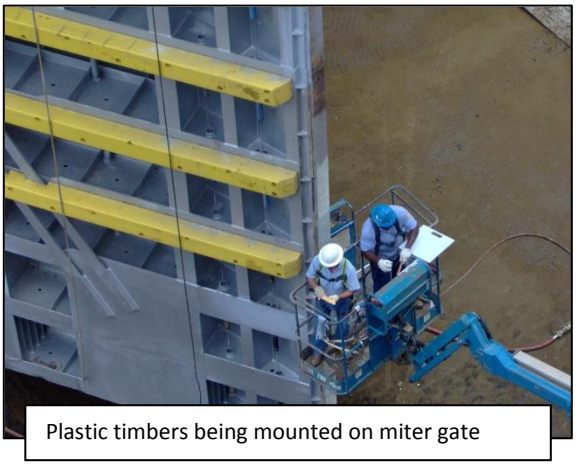
Material Selection for Bumpers & Fenders for Miter Gates and Guidewalls

Problem



Plastic timbers being mounted on miter gate

Traditionally wood is used as bumpers on miter gates and for fenders and walers on guidewall structures leading into the lock chamber. Other options are now available, such as plastic timbers made from recycled, post-consumer plastics, from ultra-high molecular weight polyethylene (UHMWPE) and from elastomeric-rubber combinations. Hollow steel members are also used as bumpers. Each material has its advantages and disadvantages. For example, plastic timbers are inherently resistant to rot and insects without any added chemical treatments but are more expensive than wood and may be prone to cracking when notched to fit around braces. In a crushing mode, plastic timbers do not absorb as much energy on impact as wood. In bending, the opposite is true. Steel provides some impact energy absorption capability when the hollow tube is collapsed but must be replaced in order to provide that capability for the next impact. Currently there is no standard guidance available and each District seems to have its preference on which material to use. This effort will develop guidance to assist design engineers in making appropriate material choices for a particular application.

Approach

This research effort is focused on the selection and use of various materials used as bumpers on miter gates and for fenders and walers on guidewall systems. Field demonstrations of the use of various materials laboratory testing will result in analyses that will inform guidance.

Products

The primary product will be engineering guidance to select and install timbers made from wood, polymers, or steel for use on miter gates and guidewall systems. This guidance is expected to be made available through the Inland Navigation Design Center. The overall investigation and field demonstration will also be described in a series of technical transfer products, including conference proceedings, technical reports, articles in publications such as Navigation e-News, and webinars.

Composite timbers installed a lock guidewall

Benefits

Materials recommended for use will provide increased service life over currently used materials, resulting in reduced maintenance costs and out-of-service times for the associated systems.

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